

ABSTRACT OF THE DISCLOSURE

[0083] A method for separating microorganisms, especially infectious agents, from a mixture by two dimensional centrifugation on the basis of sedimentation rate and isopycnic banding density, for sedimenting such microorganisms through zones of immobilized reagents to which they are resistant, for detecting banded particles by light scatter or fluorescence using nucleic acid specific dyes, and for recovering the banded particles in very small volumes for characterization by mass spectrometry of viral protein subunits and intact viral particles, and by fluorescence flow cytometric determination of both nucleic acid mass and the masses of fragments produced by restriction enzymes. The method is based on the discovery that individual microorganisms, such as bacterial and viral species, are each physically relatively homogeneous, and are distinguishable in their biophysical properties from other biological particles, and from non-biological particles found in nature. The method is useful for distinguishing infections, for identifying known microorganisms, and for discovering and characterizing new microorganisms. The method provides very rapid identification of microorganisms, and hence allows a rational choice of therapy for identified infectious agents. A particularly useful application is in clinical trials of new antibiotics and antivirals, where it is essential to identify at the outset individuals infected with the targeted infectious agent.